

**Response to CDPHE General Comments on August 1994
Draft Final Corrective Measures Study/Feasibility Study (CMS/FS)
881 Hillside Area (Operable Unit 1)
Rocky Flats Environmental Technology Site**

February 1995

ADMINISTRATIVE

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General Comments

Comment 1

General Lack of Response to Division Comments The Division finds that the DOE has in general failed to adequately respond to or resolve the vast majority of our comments and concerns in this draft CMS/FS report. These concerns were discussed with DOE staff in several meetings and are documented in the Division's comments to TM 10 and TM 11. The DOE's failure to resolve these comments has resulted in the submittal of an incomplete and inadequate draft CMS/FS.

Response

DOE has made every effort to adequately respond to comments received from both EPA and CDPHE. Many of the concerns listed in the State's comments on the OU 1 CMS/FS have not been raised during the various working meetings held between DOE, EPA, and the State since January of this year. Issues such as classification of IHSS 130 as a mixed waste landfill significantly impact the content of the OU 1 CMS/FS and should have been discussed during the identification of preliminary remediation goals and remedial action alternatives. Additionally, technical input from both agencies received during working meetings has not been representative of written comments received after review of both TMs and the CMS/FS report. For example, the State has commented heavily on the conceptual approach and parameters used to develop the OU 1 groundwater model. This information was presented to both agencies through several meetings beginning in June of this year and continuing through July. Both agencies were involved in reviewing the model as it was developed and at no time did either agency indicate a concern over the conceptual approach applied. DOE is disappointed that the State has criticized DOE's approach to the consultative process while continuing to limit the value of such meetings. These disparities have hindered proper resolution of outstanding issues, issues which often times are not discussed early in the process due to the State's consistent submittal of comments on OU 1 documents much later than EPA comments.

Resolution

During the December 8 meeting between DOE, EPA, and CDPHE it was decided that regular meetings will be held to resolve outstanding issues on the OU 1 CMS/FS report. These meetings will be instrumental in achieving a common forum through which all parties can come to agreement on specific items. Resolution will be documented herein and incorporated into the revised CMS/FS report.

Comment 2

Role of the State and RCRA Correction Action in Remedy Selection -- This Draft CMS/FS is entirely focused on CERCLA and the CERCLA process. No attempt has been made to meet the State's RCRA/CHWA requirements. Under the IAG, the State will make a Corrective Action Decision under RCRA/CHWA and the EPA will make a Remedial Action Decision under CERCLA. The CMS/FS must be adequate to support both Agencies' decisions. The IAG specifically requires that Feasibility Studies / Corrective Measures Studies comply with the requirements of CERCLA, RCRA, CHWA, and pertinent guidance and policy [paragraph 152]. The Division has stated on many occasions, both formally and informally, that the CERCLA process is only a template and some modifications to the process will be necessary to meet RCRA/CHWA CMS requirements. The DOE has repeatedly ignored these Division concerns.

In this draft CMS/FS report, the DOE's position continues to be that consistency with CERCLA RI/FS guidance takes precedence over meeting RCRA/CHWA CMS needs and requirements. The DOE's failure to address this issue has resulted in the submittal of a deficient CMS/FS document that does not meet the State's needs in making a corrective action decision for all IHSSs in OU 1. The DOE must fully recognize and meet all RCRA/CHWA requirements in the Final CMS/FS and, where necessary, deviate from CERCLA FS guidance to meet such requirements. Consistency with CERCLA guidance is not sufficient justification for ignoring the Division's concerns and comments.

Response

DOE disagrees with the State's comment that the draft final CMS/FS report is focused solely on CERCLA and the CERCLA process. Comments further state that no attempt has been made to meet the State's RCRA/CHWA requirements. CERCLA evaluation criteria duplicate RCRA evaluation criteria and include additional criteria which address community and state acceptance. The State has acknowledged that Section 4.0 of the report was not reviewed. This section represents the core of the CMS/FS and contains a detailed evaluation of both RCRA and CERCLA criteria. DOE requests that the State specify what requirements are not being met under RCRA/CHWA, since the detailed analysis of alternatives includes discussions on RCRA standards, evaluation criteria, and source control measures. Additional information regarding specific deficiencies is requested prior to responding to this comment. For information purposes, the following table lists the evaluation criteria considered under both CERCLA and RCRA guidance.

National Contingency Plan, Evaluation Criteria 40 CFR 300.430 (e) (9) (iii)	RCRA Corrective Action Plan Guidance Evaluation Criteria OSWER Directive 9902.3-2A (May 1994)
Overall protection of human health and the environment	Protect human health and the environment
	Control the sources of releases ¹
Compliance with ARARs	Comply with any applicable standards for management of wastes
	Attain media cleanup standards set by the implementing agency
Long term effectiveness and permanence	Long term reliability and effectiveness
Reduction of toxicity mobility or volume through treatment	Reduction in the toxicity mobility or volume of wastes
Short term effectiveness	Short term effectiveness
Implementability	Implementability
Cost	Cost
State acceptance	
Community acceptance	

This criterion is addressed under the National Contingency Plan threshold criteria for Overall Protection of Human Health and the Environment. This criterion is also directly related to the Long Term Effectiveness and Permanence criteria.

Resolution

During the December 8 meeting it was made clear that the State felt that the OU 1 CMS/FS report did not adequately address the RCRA CAP criteria in the detailed analysis of alternatives (DAA). The State suggested a separate working session to review the DAA and to provide input into the presentation of Section 4.0 of the CMS/FS. DOE agrees that this approach will resolve this comment and agrees to provide more information in the report on the RCRA CAP process and how it is integrated with the CERCLA process. Summary tables in Section 4.0 of the report will be revised to include specific CAP criteria where the criteria differ from those evaluated under CERCLA. For example, source control measures will be specifically discussed in the DAA to address this CAP criterion.

Comment 3

DOE Inappropriate Proposal for a CAMU -- The DOE has proposed as part of all remedial alternatives for OU 1 that the Division designate the 881 Hillside at RFETS as a corrective action management unit (CAMU). The DOE's sole intention in proposing this designation appears to be avoiding the active clean up of the hillside. The Division is bewildered by the DOE's apparent lack of understanding of the intent and substance of the CAMU regulations. The intent of CAMU is to facilitate an effective and efficient remedy, not to avoid the need for active corrective action. The Division finds the application of CAMU proposed by the DOE in this document to be inconsistent with the intent of the CAMU regulations and both the substantive and administrative requirements of CAMU.

The Division is extremely disappointed that we were not consulted on this proposal or notified of the DOE's intention to apply CAMU at OU 1 prior to the submittal of this CMS/FS report. Based on our evaluation of all information available under OU 1, the Division finds no basis for designating OU 1 a CAMU. If the DOE can provide sufficient information supporting the appropriateness of a CAMU at OU 1, this information must be discussed and a CAMU designation agreed to by the Agencies prior to its inclusion in the Final CMS/FS.

Response

DOE has proposed use of the Subpart S hazardous waste requirements as a possible means of achieving an effective and efficient remedy for OU 1. The information on the Corrective Action Management Unit (CAMU) rule that DOE has access to is the Commission's proceedings on adopting the rule and the rule itself (6 CCR 1007.3-264.552). The CAMU approach to OU 1 was proposed in this draft final CMS/FS for review and discussion with the State, as is required under the CAMU rule. If the State does not agree that the CMS/FS report is the proper forum for discussing the CAMU concept at OU 1, then DOE requests that the State suggest an appropriate forum for this discussion within the confines of the IAG.

Resolution

During the meetings held on December 8 and December 14, 1994, between DOE, EPA and CDPHE, it was agreed that the CAMU language will be removed from the CMS/FS report. CDPHE agreed that an IHSS by IHSS evaluation is not required for alternative development as long as each source area and IHSS is identified in the OU 1 CMS/FS and dispositioned in terms of remedial actions. The CAMU concept was proposed to retain an OU wide approach to alternative analysis at OU 1. Based on the State's revised position on the IHSS by IHSS evaluation issue, the CAMU language will be removed.

Comment 4

Information Necessary to Support a Corrective Action Decision -- This comment was originally made to TM 11 and has not been resolved to the Division's satisfaction in the Draft CMS/FS. The draft CMS/FS does not contain sufficient information to support a CAD for all of the IHSSs in OU 1. The Division will not consider the Final CMS/FS to be complete until all IHSSs and/or source areas in OU 1 are sufficiently addressed. This draft CMS/FS only addresses contamination at IHSS 119.1 at a minimum; the group of IHSSs south of Building 881, IHSS 130, and IHSS 119.2 must also be evaluated.

This concern was raised in the Division's comments to the draft TM 11 and clarified in a meeting with DOE and EG&G staff. The DOE formally responded to this concern on September 30, 1994, almost a month after releasing the draft CMS/FS. The Division finds the DOE response to this comment inappropriate, inaccurate, and inconsistent with both the IAG and the risk screening approach that all parties agreed to.

The evaluation of each IHSS is consistent with the CERCLA process and has been recognized by the EPA as necessary and appropriate for all OUs at RFETS. Regardless of CERCLA guidance, the Division requires the CMS/FS contain sufficient information to fully support a corrective action decision by the Division under RCRA/CHWA for each IHSS and/or source area in OU 1.

The DOE disagreement with the Division's application of the risk screening approach is concerning. This screening methodology was agreed to by all parties, including the DOE.

The development of remedial action alternatives must start at the IHSS and/or source level. Corrective measures must be selected for each IHSS and/or source area that are fully protective and meet all appropriate RAOs and PRGs. The number and range of alternatives evaluated for each IHSS and/or source area may be limited by the scope and complexity of contamination and availability of treatment options. Alternatives selected for each IHSS should then be combined to form a range of remedial action alternatives for the operable unit. When appropriate, IHSSs with similar effective alternatives can be combined to achieve economies of scale. Alternatives developed at the operable unit level must provide the range of alternatives prescribed in EPA guidance.

The Division recognizes that it may not be efficient to address all contamination strictly through IHSSs; in some instances it may be more efficient to address an area of contamination as a source area independent of the IHSSs. This does not mean that each IHSS does not need to be addressed.

The DOE statement in response to this comment under TM 11 that the groundwater contamination at the eastern edge of the operable unit has not been definitively tied to any one IHSS is correct but totally misleading. As reported in the OU 1 RFI/RI Report, this contamination was in fact attributed by the DOE to multiple IHSSs, although not definitively. To definitively tie the contamination on the eastern edge of OU 1 to IHSS 119.2 and/or the 903 Pad would require additional, largely unnecessary, characterization field work. Regardless of the source of contamination near IHSS 119.2, it must be addressed in the OU 1 CMS/FS.

Response

The meetings referenced in this comment were held during the preparation of the OU 1 CMS/FS report. Both regulatory agencies have repeatedly denied DOE's informal requests to extend the schedule for preparation of the CMS/FS report. Many of the comments received on the OU 1 CMS/FS are based on

unresolved issues from the OU 1 RFI/RI report. The State must recognize that many of these issues impact the CMS/FS directly and therefore impact its schedule. Because both agencies have repeatedly insisted that the CMS/FS report be produced prior to resolution of these issues, agreements made between the agencies and DOE may not be represented in the draft final CMS/FS.

In addition, as stated in the response to comments received on TM 11, DOE does not agree that individual IHSSs should be examined for remedial action alternatives. The IAG states that the CERCLA RI/FS guidance should be used as the template for conducting OU CMS/FSs. The IAG also establishes the OU concept and recognizes the need for evaluating remedial actions at the OU level. The OU concept is particularly suited to the circumstances of OU 1, where unspecified sources of groundwater contamination have resulted in OU wide contamination at various levels. The OU 1 RFI/RI document also does not support an IHSS by IHSS evaluation. If the State feels that IHSSs should be evaluated individually for overall protection to human health and the environment, then the State should initiate these evaluations through the RFI/RI process and not the CMS/FS process. The BRA results must at some point be used by the State to determine if further action is warranted at a site or in this case, at an IHSS. It is inappropriate for the State to request that the CMS/FS be used as a vehicle to identify no action decisions prior to conducting a detailed analysis.

DOE requests that the State provide additional guidance on the value of evaluating each IHSS and source area independently in the OU 1 CMS/FS report. As the last paragraph of this comment suggests, the contamination near IHSS 119.1 must be addressed regardless of its source. DOE does not believe that the groundwater medium beneath OU 1, which represents the highest potential risk to viable receptors, can be evaluated on the basis of individual IHSSs. DOE has proposed alternatives that remediate both the most contaminated areas of OU 1 groundwater as well as the OU as a whole. These alternatives adequately represent potential remedial action strategies at this OU. To address this comment, the revised CMS/FS will contain additional information regarding each IHSS's status in terms of each alternative.

Resolution

During the December 8 meeting, the State voiced the concern that the public may not be able to follow the decision process if individual IHSSs are not specifically discussed in the OU 1 CMS/FS report. DOE suggested that IHSSs be discussed early in the report to identify specific source areas. These source areas will then be addressed separately and evaluated for remedial action. The discussion on IHSSs and how they are addressed by the source area approach will be included in future documents (such as the Proposed Remedial Action Plan/Proposed Plan) as well. The State concluded that individual alternative analyses are not required for each IHSS as long as each IHSS is included in the initial discussion of source areas. Also see resolution to General Comment #4.

Comment 5

RCRA/CHWA Criteria for the Evaluation of Final Corrective Measure Alternatives – The Division will use the RCRA corrective action evaluation criteria presented in the latest version of the RCRA Corrective Action Plan (OSWER Directive 9902 3 2A May 1994) a guidance document produced by EPA for implementation of RCRA corrective action as guidance in evaluating remedial action alternatives. These standards reflect the major technical components of remedies including cleanup of releases, source control and management of wastes that are generated by remedial activities.

The specific standards as set out in the RCRA CAP guidance include 1) protect human health and the environment 2) Attain media cleanup standards set by the implementing agency 3) Control the source of release so as to reduce or eliminate to the extent practicable further releases that may pose a threat to human health and the environment 4) Comply with any applicable standards for management of wastes 5) Other factors. Other factors include five general factors that will be considered as appropriate by the Division in selecting a remedy that meets the four standards above. The five general factors include a Long term reliability and effectiveness b Reduction in the toxicity, mobility or volume of waste c Short term effectiveness d implementability and e Cost.

RCRA/CHWA corrective action remedies must meet the above listed standards. Therefore the Final CMS/FS must provide detailed documentation of how the potential remedy will comply with each of the Five RCRA CAP standards.

Response

DOE believes that the five criteria of EPA's RCRA Corrective Action Plan (OSWER Directive 9902 3 2A pp 63-67) and the nine criteria of the National Contingency Plan (NCP) in 40 CFR 300.430(e)(9) are essentially identical (see Table in response to General Comment #2). It is DOE's understanding that EPA has strived over the last seven years to provide guidance that can be consistently implemented at various sites with the same contaminants under the two sets of regulations. The overall objective of the two acts is the same in situations of contaminant releases and agency selection of remedies. Specific differences would seem to point to additional criteria in the NCP regulations such as community acceptance. It is emphasized that the RCRA Corrective Action Plan is a guidance as is the CERCLA RI/FS guidance.

The State asserts that RCRA/CHWA corrective action remedies must meet the listed standards and suggests that the CMS/FS provide detailed documentation of how the potential remedy will comply with each of the standards. It is DOE's position that in fact the referenced standards are not standards but evaluation criteria. These criteria are evaluated in the detailed analysis of alternatives presented in Section 4.0 of the CMS/FS report. Until the State has reviewed this section of the document it is inappropriate to assume that the RCRA CAP evaluation criteria are not included.

Resolution See Resolution to General Comment #2

Comment 6

Effectiveness of Remedial Action/Corrective Action to Protect the Environment -- This comment was originally made to TM 11 and has not been resolved to the Division's satisfaction in the Draft CMS/FS

The general assumption that remedial actions at OU 1 that are protective of human health will adequately protect ecological receptors and environmental resources at OU 1 is not appropriate in the CMS/FS report. The effectiveness of each alternative to protect the environment must be evaluated. The DOE response to this comment under TM 11 that it is not necessary to consider environmental protectiveness in the OU 1 CMS/FS because the OU 1 BRA EE did not identify any significant hazards to ecological receptors is not an acceptable response.

The BRA EE finds that many of the contaminants evaluated in the BRA EE are toxic to ecological receptors at concentrations found at OU 1 but that because of the limited extent of contamination no adverse ecological impacts occur. The assumption that contamination is limited and no adverse ecological impacts will occur is not valid under all of the OU 1 CMS/FS remedial alternatives specifically those alternatives which allow contamination to continue to migrate uncontrolled could invalidate this assumption. The effectiveness of all remedial alternatives to protect the environment must be fully addressed in the Final CMS/FS.

Response

The assumption that remedial actions at OU 1 that are protective of human health will be protective of ecological receptors is based on the results of the OU 1 RFI/RI report. The results of which indicate that there is no current or future significant risk to these receptors. The effectiveness of each alternative to protect the environment is evaluated in the detailed analysis of alternatives (Section 4.0). This section was not reviewed by the State and therefore the comment that this evaluation was not conducted may be premature.

The State concludes that the assumption that contamination is limited and no adverse ecological impacts will occur is not valid under all of the OU 1 CMS/FS remedial alternatives due to the potential for contaminant migration. This assumption is based on the RFI/RI surface soil evaluation and is not related to groundwater contamination which is the focus of the CMS/FS report. The groundwater medium was not identified as a potential source of future risk to ecological receptors and therefore the assumption is valid unless the State has identified future risks to ecological receptors from groundwater contaminants that are not identified in the OU 1 RFI/RI report.

Resolution

During the meetings held on December 8 and December 14, 1994 between DOE, EPA and CDPHE it was agreed that the resolution to this comment will be present a more thorough analysis of short term impacts to the environment under the Detailed Analysis criterion of Short Term Effectiveness.

Comment 7

Incomplete and Inaccurate Identification of ARARs -- The Division has commented on several occasions regarding specific deficiencies in the identification of ARARs for OU 1. The Division has expressed major concerns with the DOE's identification and determination of ARARs under TM 10. The majority of the Division's comments and concerns regarding ARARs have not been adequately addressed and remain unresolved in this draft CMS/FS. In comments to TM 11, the Division deferred ARARs comments in hope that several outstanding issues could be resolved through the ARARs Working Group. Unfortunately, the DOE has chosen to proceed at an extremely slow pace under the ARARs working group and the group has yet to entertain substantive ARARs discussions.

The Division's general comments on specific potential ARARs are presented below. Additional ARARs comments are also included in the Division's specific comments. All ARARs issues must be resolved in the Final CMS/FS before the Division will consider the document to be complete.

- a) State Groundwater Standards -- The DOE has failed to present any valid argument to support its claim that the State groundwater standards are not ARARs. This document states that groundwater standards are not addressed ARARs because the classifications requiring those standards have not been applied consistently throughout the State and thus fail the NCP criteria of general applicability in 40 CFR 300.400 (g) (4). This argument, much like the last two arguments against the application of State groundwater standards as ARARs, is simply incorrect. Contrary to this argument, the phrase "general applicability" has nothing to do with whether or not standards have been applied consistently. The preamble to the NCP explains that "of general applicability" means that potential State ARARs must be applicable to all remedial situations described in the requirement, not just CERCLA sites. Consistent with the preamble's explanation, State groundwater standards are applicable to all situations, not just CERCLA sites, and therefore are of general applicability. Moreover, no classifications exist for organics; rather, the standards for organics apply statewide regardless of classification. Therefore, the claim that the classifications requiring those standards have not been applied consistently makes no sense.
- b) RCRA/CHWA Subpart F Groundwater Protection RCRA/CHWA groundwater protection standards were identified in the Division's comments to TM 10 as potential chemical specific ARARs. They have not been included in the draft CMS/FS. These standards must be identified as potential ARARs in the Final CMS/FS.
- c) Doctrine of Sovereign Immunity -- The DOE, in response to Division and EPA comments on sovereign immunity, has stated that it has removed such language from the text of the CMS/FS, but that questions regarding sovereign immunity may still be discussed during ARARs working group meetings. The Division and EPA positions on sovereign immunity appear to be clearly presented; however, if the DOE has any remaining questions at OU 1, they must be raised under this CMS/FS Report.
- d) Surface Water Standards State surface water standards were identified in the Division's comments to TM 10 as potential chemical specific ARARs. They have not been included in the draft CMS/FS. These standards must be identified as potential ARARs in the Final CMS/FS.

- e) Closure of French Drain -- The requirements for the final closure of the french drain must be identified as ARARs and included in the detailed analysis of alternatives
- f) Radioactive, Hazardous and Mixed Waste Landfill Requirements -- The Division considers IHSS 130 to be a mixed hazardous waste landfill which must be closed in accordance with all applicable landfill regulatory requirements. Therefore the DOE must identify all ARARs and TBC associated with landfills in this CMS/FS. This determination is based on the documented disposal of radioactive waste in the IHSS, the known or suspected disposal of hazardous waste debris associated with the OPWL in the IHSS, and the detection of hazardous waste constituents in groundwater monitoring wells directly downgradient of the IHSS. This landfill is located on an unstable hillside, is not capped and has no controls in place to prevent future release or exposure to hazardous constituents or radionuclides. Regardless of the current risk associated with IHSS 130, the DOE must meet all appropriate regulatory criteria for landfills. The DOE must identify all ARARs relevant to solid, radioactive, hazardous and mixed waste landfills.

Response

DOE disagrees with the statement that the identification of ARARs in the OU 1 CMS/FS is incomplete. The State may disagree with the selection of ARARs, however, the identification of ARARs in the CMS/FS and in TMs 10 and 11 was performed according to guidance and regulations (40 CFR 300.430(b)(9), (d)(3), (e)(2), and (e)(9)). During the review of TM 11, the State emphasized that action specific ARARs were being reviewed and comments would follow shortly. These comments were never received and therefore State comments were not available prior to preparation of the CMS/FS report. The following responses are applicable to other portions of this comment.

- a) DOE has carefully reviewed the State's position and the regulations concerning the State's Basic Standards for Ground Water (5 CCR 1002.8.3.11.5). DOE has determined that the State's basic standards are potential ARARs for all contaminants except radionuclides. The CMS/FS will be revised to reflect this potential ARAR at OU 1.
- b) The RCRA groundwater protection standards (6 CCR 1007.3.264 Subpart F) were briefly mentioned in the detailed analysis of alternatives in the CMS/FS. The CMS/FS will be revised to clarify that the RCRA groundwater protection standards are potential chemical specific ARARs and that the process of establishing groundwater protection standards at the point of compliance is part of the selection of a protective remedy under RCRA and CERCLA. The RCRA groundwater protection standards are maximum contaminant levels, background levels, or alternate concentration levels as approved by the Director (6 CCR 1007.3.264.94). It is noted that MCLs were used in the CMS/FS as the potential chemical specific ARARs and thus used to identify PRGs.
- c) This comment is noted. DOE believes that the proper forum for further discussion of sovereign immunity is the ARARs working group.
- d) Although the State identified the Colorado surface water quality standards as potential chemical specific ARARs earlier in the CMS/FS process, surface water has not been one of the media investigated at OU 1. The RFI/RI identifies soil and groundwater as the media of concern within the boundaries of OU 1. Information presented in the RFI/RI on the water quality of Woman Creek and the South Interceptor Ditch is from OU 5 and other locations.

- e Clarification of this comment is required in order to respond to the comment The french drain collects ground water and to our knowledge is not a waste unit DOE is unfamiliar with specific requirements applicable to closure of a french drain DOE requests that the State provide specific references to support the comment
- f The identification of IHSS 130 as a mixed waste landfill is the first comment from the State on this subject since the initial preparation of the CMS/FS report The RFI/RI report did not identify this issue and the comment was never raised by the State DOE requests that the State specify its requirements for determining what areas are considered mixed waste landfills at the RFETS and what regulatory basis is being used for these designations

Resolution

This comment is being resolved through the ARARs working group Comments a b and d are resolved as stated in the responses above however Comments e and f could not be substantiated by the Division in terms of providing regulatory justification for the comments Closure requirements or performance standards are not available for the French Drain Likewise the Division could not justify the position that IHSS 130 is a mixed waste landfill The CMS/FS report will be revised as appropriate to clarify the text

Comment 8

Point of Compliance with Preliminary Remediation Goals -- The DOE has incorrectly determined Women Creek as the point of compliance for protectiveness and ARARs requirements at OU 1. State groundwater standards are applicable to all groundwater in OU 1. The point of compliance for groundwater PRGs at OU 1 is therefore anywhere that groundwater is present at OU 1. That is, they both must be met. The correct point of compliance must be incorporated into this report and utilized in the development and screening of alternatives. Once a remedy is selected, a new point of compliance for remedy effectiveness will be chosen and specifically delineated.

Response

Woman Creek has not been selected as a point of compliance in the draft final CMS/FS report. DOE's position on this issue is that the point of compliance should be discussed in working meetings with the agencies. The meetings held in July 1994 with representatives from both agencies concerned groundwater monitoring and covered the subject of point of compliance. These discussions were focused on the RCRA requirements found in 6 CCR 1003.7-264.95 and the State's groundwater regulations in 5 CCR 1002.8-311.6. The RCRA requirements specify the following:

The point of compliance is a vertical surface located at the hydraulically downgradient limit of the waste management area that extends down into the uppermost aquifer underlying the regulated unit where the waste management area is

the limit projected in the horizontal plane of the area on which waste will be placed during the active life of a regulated unit

and includes horizontal space taken up by any liner, dike, or other barrier designed to contain waste in a regulated unit, or

if the facility contains more than one regulated unit, the waste management area is described by an imaginary line circumscribing the several regulated units.

Whereas the State's requirements specify that for contamination identified and reported on or before September 30, 1992, the point of compliance for the statewide standards shall be at whichever of the following locations is closest to the contamination source:

the site boundary, or

the hydrologically downgradient limit of the area in which contamination exists when identified.

The State's comment defining the point of compliance as "anywhere that groundwater is present at OU 1" appears to be inconsistent with both sets of regulations. DOE requests clarification as to the basis for the State's assertion that the point of compliance has no relation to site boundaries and that the point of compliance should be arbitrarily set in the CMS/FS only to be revised once a remedy is selected.

Resolution

Resolution to this comment is pending separate discussions concerning point of compliance issues.

Comment 9

Selection of Preliminary Remediation Goals The DOE has selected State MCLs as PRGs for OU 1 in this draft CMS/FS. While the division considers State and Federal MCLs to be potential ARARs for OU 1, the Division does not find that State MCLs are necessarily the appropriate PRGs for all contaminants for either IHSS 119.1 or the OU. Sufficient documentation supporting how and why the DOE selected State MCLs as PRGs for OU 1 is not included in the CMS/FS Report. The rationale for selecting State MCLs over risk based PRGs or other ARARs is not included in the draft CMS/FS. PRGs should be the lower of chemical specific ARARs or risk based PRGs that exceed background and appropriate PQLs. Compliance with ARARs and protection of human health and the environment are two distinct CERCLA requirements for remedies. PRG selection must be correctly implemented and fully documented in the Final CMS/FS.

Response

PRGs were established by following the NCP (40 CFR 300.430 (e)(2)(i)) and RCRA CAP guidelines (pgs. 49 and 50). DOE does not agree that groundwater PRGs should be set at the lowest possible value available regardless of the practicality of remediating to this value. This is particularly true in the case of OU 1 where groundwater is marginally available and does not present a realistic source of usable drinking water. This comment will be addressed further under the forum of the ARARs working group. Justification for selection of State MCLs was provided during the working meetings held between DOE, EPA, and the State in January of this year and is included in TM 10. At the request of both agencies, much of the material presented in the TMs was not included in the OU 1 CMS/FS to limit duplication of material. If this approach is no longer desired by the agencies, then DOE will include the material from both TMs in the revised CMS/FS report.

Resolution

During the meeting held on December 14, 1994, between DOE, EPA, and CDPHE, it was agreed that State groundwater standards will be identified as potential chemical specific ARARs for OU 1. Groundwater PRGs will therefore be based on these standards. Risk based PRGs will not be presented in the final CMS/FS report. It is assumed that State groundwater standards are considered protective by the State and therefore risk based PRGs are not required for groundwater. This is consistent with the NCP that specifies that chemical specific ARARs are generally appropriate when available. Risk based values are typically only necessary when chemical specific ARARs are not available or are otherwise not sufficient to protect human health and the environment.

Comment 10

Development of Preliminary Remediation Goals The Division does not find that the PRGs developed in section 2.3 of this draft CMS/FS adequately address all of the RAOs presented in Section 2.2 or the additional RAOs required in the Division's specific comments. The State MCLs selected by the DOE as PRGs for groundwater fail to meet the groundwater RAO as identified in this draft CMS/FS report. No PRGs have been developed to ensure protection of groundwater from degradation by subsurface soil contamination under the subsurface soil RAO. PRGs must be developed that ensure all RAOs are obtained at OU 1. This includes the complete and accurate identification of all chemical specific ARARs.

Response

DOE requests clarification of this comment. Specifically, the comment states that State MCLs fail to meet the groundwater RAO listed in the draft final CMS/FS report, then goes on to state that no PRGs have been developed to ensure that protection of groundwater from degradation by subsurface soil contamination under the subsurface soil RAO. DOE requests clarification as to which RAOs the State is referring to in regard to the MCLs. MCLs are presented as PRGs for groundwater and are not intended to target the subsurface soil medium.

In addition, subsurface soil PRGs cannot be established unless there exists a clear source of subsurface soil contamination to groundwater. Repeated efforts to obtain samples from the IHSS 119.1 area that contain possible contaminant sources have indicated that there are no clear source areas identifiable at the IHSS, and therefore no sources for which PRGs can be established and measurably achieved. With regard to ARARs, identification of chemical specific ARARs is discussed in the responses to General Comments #7 and #9 and will be addressed through the ARARs working group. It is important to note here that not all RAOs necessarily require quantified PRGs.

Resolution

Based on the meeting held on December 8, 1994, this comment will be resolved by revising the subsurface soil RAO included in the CMS/FS report to state the following: Prevent migration of contaminants from subsurface soils to groundwater that would result in groundwater contamination in excess of groundwater ARARs for OU 1 contaminants.

Comment 11

Risk Based PRG Calculation Methodology -- The Division specifically raised several concerns with the calculation of risk based PRGs in comments to TM 10. The DOE has failed to adequately address many of these comments. Many of these issues remain unresolved from the Final Phase III RFI/RI Report. The Division approved the Revised Final Phase III RFI/RI Report Rocky Flats Plant 881 Hillside OU1 June 1994 contingent upon DOE's revisions on a limited number of issues. These issues cannot simply be addressed by discussing them in the Phase III RFI/RI report comment response section. The Division has not been convinced by DOE's arguments and expects compliance with our requests.

The Division's major issues included: an adequate quantitative assessment of external irradiation both OU wide and at the source; a good qualitative assessment of toxicity of PAHs and PCBs and also of those chemicals for which there are not as yet any EPA toxicity factors; calculation of intake values for all those chemicals for which there are as yet no EPA toxicity factors; an assessment of surface soil exposure to the construction worker receptor; and a more objective presentation of the risks. As of yet the Division has not seen any revisions. Therefore DOE's contention that absolutely no changes will be made in the PRG documents or methodology because similar methodologies were used in the RI/RFI document is premature. The Division is particularly concerned by the DOE's refusal to calculate external exposure to radiation by a future resident. This calculation is supported both by RAGS (Part B p 35) and by ICRP 26 and 30.

Response

The concerns listed in this comment do not apply to the OU 1 CMS/FS report. They are primarily RFI/RI issues as stated in the comment and do not affect alternative development. In addition the State has requested throughout the comment document that the OU 1 CMS/FS report not include any reference to the surface soil medium. DOE seeks clarification as to why the concerns listed in this comment are presented here in light of the State's comments regarding this medium. Although the State is particularly concerned about external exposure to radiation by a future resident DOE requests clarification of how this will affect the evaluation of remedial action alternatives for groundwater at OU 1.

Resolution

Based on the meeting held on December 8, 1994 between DOE, EPA and CDPHE, this comment is not relevant to the OU 1 CMS/FS report and is therefore noted but does not require a revision to the document.

Comment 12

Failure to Consider ALL Contaminants -- This comment was raised in the Division's comments to TM 10 and TM 11. It has not been fully addressed by the DOE and remains a deficiency in this draft CMS/FS report.

The Division, under its corrective action authority, will consider all hazardous constituents found at OU 1 in making a corrective action decision. Therefore, the CMS must include all contaminants and cannot be limited to only the BRA COCs. The BRA COC screen was developed to focus the BRA risk evaluation on risk drivers. This screen does not preclude non COCs from being present at levels above risk-based concern or that need management and monitoring. This is evident in Table 5.2 of the draft CMS/FS where many non COCs are shown to be present at OU 1 at concentrations above risk-based PRGs. As stated by the Division in previous comments, the Division requires that all contaminants identified at OU 1 be included and fully evaluated in the OU 1 CMS/FS.

Response

The table referenced in this comment is unknown. In addition, DOE requests clarification on the State's position that all contaminants identified at OU 1 be fully evaluated. It is unclear in this comment how a contaminant is evaluated. The focus of the CMS/FS report is to evaluate remedial action alternatives using specific COCs as indicators to determine the effectiveness of each alternative. The CMS/FS report will be revised to specify that the complete list of contaminants are potential COCs, although the alternative evaluation process will remain unchanged.

The revised groundwater model will evaluate all of the organic contaminants identified in the OU 1 BRA. In addition, TCE will be modeled since it appears in concentrations similar to other identified BRA COCs. Other contaminants which appear at much lower concentrations in OU 1 will be qualitatively evaluated in the revised CMS/FS report. This approach should meet the intent of this comment while preserving the integrity of the existing groundwater model.

Resolution

This comment will be addressed by the revised groundwater model, which now includes all of the BRA organic COCs as well as TCE. Other contaminants will be evaluated qualitatively but occur at much lower concentrations throughout the site and are adequately represented by the modeled COCs.

Comment 13

Subsurface Soils Preliminary Remediation Goals The DOE has repeatedly failed to respond to the Division's concerns that subsurface soil contamination is not being adequately addressed in the CMS/FS. The DOE continues to claim that subsurface soils were found not to present unacceptable risk in the BRA and thus do not require consideration. This is not correct; subsurface soils were indirectly evaluated in the BRA through groundwater pathways, many of which were found to present elevated risks.

Regardless of the BRA, hazardous constituents are present in the subsurface soils within OU 1 and must be evaluated in the RCRA/CHWA Corrective Measures Study and subsequent Corrective Action Decision. Therefore, subsurface soils must be considered along with groundwater in developing RAOs and PRGs. RAOs and PRGs for subsurface soils must be based on risk protection of groundwater and ARARs.

Response

DOE requests clarification from the State as to how subsurface soil PRGs can be developed based on risk protection of groundwater and ARARs when no direct risks have been identified in the BRA and chemical-specific ARARs currently do not exist for this medium. The State has repeatedly suggested that PRGs be developed for subsurface soils without providing guidance as to what is being requested.

Additionally, given the wide variability in partitioning values found at OU 1, PRGs cannot be reliably calculated for subsurface soils based on these values. DOE therefore requests that the State clarify whether it is asking for PRGs based on ingestion of subsurface soil or on contaminant transport to groundwater. If the latter is the primary concern, then this issue should have been raised as an RFI/RI issue. It is unclear why the State is continuing to question RFI/RI issues in this document inappropriately.

Resolution

Based on the meetings held on December 8 and December 14, 1994, between DOE, EPA, and CDPHE, subsurface soil PRGs will not be calculated directly. The subsurface soil RAO included in the OU 1 CMS/FS report will be revised as discussed in the response to General Comment # 11.

Comment 14

Inadequate Documentation of Remedial Action Alternative Development and Screening Process -- The Division does not find the documentation and supporting rationale for the development and screening of remedial action alternatives as presented in TM 11 and the draft CMS/FS to be adequate. The Division commented on the development and screening of alternatives in several specific comments to TM 11. The DOE has failed to resolve these comments or address the Division's concerns.

The DOE has on several instances chosen to cite CERCLA guidance as a rationale for not addressing the Division's concerns. This is not adequate. All of the Division's comments must be fully resolved to the Division's satisfaction and integrated into the CMS/FS. The CMS/FS must include a thorough documentation of the remedy development and selection process including appropriate supporting rationale. It is not appropriate to reference the DRAFT TM 11 for this documentation.

Response

The draft TM 11 document was incorporated by reference in the OU 1 CMS/FS report as agreed to by DOE, EPA, and the State during various working meetings. At the request of both regulatory agencies, this was done in order to limit the duplication of material found in the TMs and the CMS/FS report. If desired, the final CMS/FS report will include all of the material originally presented in the TMs, although each document will still be available in the administrative record.

CERCLA guidance has been cited where necessary to justify the amount of detail included in the CMS/FS report and/or to explain how specific concepts are applied in the CMS/FS process. DOE has attempted to satisfactorily address the State's concerns while maintaining the intent of RCRA and CERCLA cleanup guidelines which specify evaluating various criteria to determine both the feasibility and necessity of initiating remedial actions. The State's position to date has been that remedial action is warranted at OU 1 regardless of the results of the detailed analysis of alternatives. DOE fundamentally disagrees with this approach and has therefore cited guidance where necessary to maintain an appropriate and accepted methodology for remedy selection.

Resolution

The revised CMS/FS report will not reference the draft TM 11 document. The report will provide information regarding both RCRA and CERCLA remedy selection processes and will incorporate State comments as appropriate.

Comment 15

Impacts of Decommissioning of the French Drain -- Several of the alternatives presented in this document including the DOE preferred alternative recommend the decommissioning of the french drain. The text in several sections discusses decommissioning the french drain by breaching the drain with a backhoe. It does not appear that the decommissioning of the drain was considered in modeling of contaminant migration down gradient of the drain. Specifically any breach in the drain would become a preferential pathway for transport to Women Creek. Contaminated groundwater collected in the decommissioned drain would essentially be discharging directly to Women Creek as surface water. This pathway must be considered in modeling the impact of decommissioning the drain.

The current modeling assumes that if the french drain were decommissioned contamination would eventually reach Women Creek via continued migration of the contaminant plume down gradient of the drain. The fate of contaminated groundwater collected within the french drain after decommissioning must be considered in modeling the impact of such alternatives.

Additionally the eventual final closure of the french drain raises many issues that have yet to be considered including potential decontamination methods, closure performance standards and potential post closure care requirements for the drain. The Division strongly recommends that the DOE fully consider these issues in evaluating the role of the french drain in remedial alternatives at OU 1.

Response

Decommissioning of the drain was not considered in modeling of contaminant migration downgradient of the drain. As discussed in the response to General Comment #1, this issue was not raised during the various meetings held with both regulatory agencies to discuss the conceptual approach applied to modeling OU 1. Additionally, it is unclear 1) how decommissioning of the drain would result in direct discharge to surface water, and 2) how the State wishes this pathway to be considered in modeling the impact of decommissioning the drain. DOE therefore requests clarification as to what type of modeling the State is suggesting for the french drain.

The State's comments regarding decontamination methods for the french drain are likewise unclear. DOE is unaware of any regulatory provisions for decontaminating this type of unit, for closure performance standards, or potential post-closure care requirements. DOE requests clarification as to what State requirements are being referenced, and how these requirements affect selection of a preferred remedy at OU 1.

Resolution

Resolution of this comment is pending information from the State concerning decontamination requirements, closure performance standards, and potential post-closure care requirements for the drain.

Comment 16

Role of Institutional and Engineering Controls -- NCP explains that institutional controls shall not substitute for active response measures as the remedy unless such active measures are determined not to be practicable based on the balancing of trade-offs among alternatives (300.430 (a) (1) (iii)). Clearly not the case here. In any event, the use of institutional controls to limit exposure at the site does not alleviate the requirement to meet or waive all ARARs.

Response

DOE agrees with the statement on the use of institutional controls. DOE requests clarification of the State's position given the State's acknowledgment that it has not reviewed the detailed analysis of alternatives and therefore has not examined the analysis of the RCRA and CERCLA evaluation criteria (i.e. trade-offs) for each proposed remedial action. DOE also requests that the State specify why institutional controls are not appropriate for OU 1. DOE agrees that the use of institutional controls do not alleviate the requirement to meet or waive all ARARs and does not present this view in the CMS/FS report.

Resolution

This comment does not require resolution.

Comment 17

Regulatory Requirements for IHSS 130 Radioactive Site 800 Area -- Recent groundwater monitoring data for the three monitoring wells directly down gradient of IHSS 130 (36391 36691 37191) show the presence of hazardous constituents not detected during the Phase III RFI/RI sampling. The data from two of these wells over the time frame utilized in the RFI/RI (1990 to mid 1992) were limited to only a single sampling event. The newer 1993 monitoring data may confirm the HRR report that hazardous waste associated with the OPWL were disposed of at this IHSS and are potentially leaching from this IHSS into the groundwater. As a result the Division is currently reviewing this monitoring well data to determine if IHSS 130 is a potential hazardous waste landfill as well as a radioactive waste landfill. As such the Division requires that remedial action alternatives be developed for this landfill that are protective of human health and the environment and meet all the appropriate regulatory requirements.

Response

DOE disagrees with the assumption that IHSS 130 should be considered a mixed waste landfill. DOE requests that the State provide justification as to why this IHSS falls into this regulatory classification. DOE also disagrees with the State's position given that it is still trying to determine whether IHSS 130 is a potential hazardous waste landfill based on downgradient groundwater data. This comment represents a significant departure from the approach to alternative development presented to the agencies since January of this year. Raising such an issue after preparation of the draft final CMS/FS limits the value of the consultative process that has been occurring to date between DOE and the regulatory agencies. The State has criticized DOE for its approach to negotiating issues; however, it appears as if the discourse which occurs during CMS/FS working meetings is not being considered in written comments. Since January of this year the focus of the OU 1 CMS/FS has been on groundwater remediation. This approach is supported by the RFI/RI report and the BRA in particular. DOE's position is that it is inappropriate to target units for remediation which have not been identified as risk contributors at the site and do not exceed existing ARARs.

Resolution

During the meeting held on December 14, 1994, between DOE, EPA, and CDPHE, the State revised its position that IHSS 130 is considered a mixed waste landfill. The State is currently reviewing its approach to classifying this IHSS.

Comment 18

Use of All Available Data The modeling and analysis of groundwater data in this report must use all available field data. Groundwater monitoring data for the hillside is available from 1987 to the present. Limiting this report to groundwater data from 1990 to mid 1992 is not appropriate. Additionally there is no mention of the December 1993 soil gas survey conducted at IHSS 119.1. The Division requires that all available field data be used in the Final CMS/FS. It is important to note that the RFI/RI was performed using data gathered at a finite point in time (1990 to mid 1992). Inclusion of any new pertinent data into the development of the final CMS/FS is essential in order to help ensure an accurate CMS/FS. Therefore as new information is obtained and evaluated further field work at OU 1 may be required prior to a remedy selection.

Response

DOE believes it is appropriate to use the data set considered in the RFI/RI report for the groundwater model constructed for the OU 1 CMS/FS. Groundwater monitoring data for the hillside is available to the present date and will continue to be available in the future. The data set selected for the model is the most appropriate data set to use given its use in the RFI/RI report to which results of the model are being compared. However at the request of both agencies the groundwater model has been revised to include data through 1994. It is assumed that this data will be sufficient to satisfy this comment.

DOE disagrees with the State's position that as new information is obtained and evaluated further field work at OU 1 may be required prior to remedy selection. Remedy selection is based on the results of the CMS/FS report which in turn is based on the results of the RFI/RI report. DOE believes that the State is inappropriately suggesting continued RFI/RI characterization while continuing to request that the CMS/FS be conducted regardless of unresolved characterization issues.

The CMS/FS report will be revised to reference all soil gas surveys. The data was used indirectly in the CMS/FS during conceptualization of remedial action alternatives. The text will be revised to include this information.

Resolution

This comment will be resolved as discussed in the response presented above.

Comment 19

Detailed Analysis of Alternatives As documented in the Division's comments the DOE has made many fundamental mistakes in the CMS/FS process including selection of ARARs and PRGs and the development of alternatives. The number and degree of these mistakes have forced the Division to conclude that the underlying basis for the detailed analysis of alternatives and the preferred alternative presented in this draft CMS/FS are fatally flawed and without basis. The Division requires that after the ARARs PRGs development of alternatives and all other underlying errors in this report are corrected the detailed analysis of alternatives and DOE preferred remedy by reworked.

The detailed analysis of alternatives must include detailed documentation of how the potential remedy will comply with each of the five standards for evaluation of a final corrective measure alternative presented in the RCRA Corrective Action Plan (OSWER Directive 9902.3-2) as well as the nine CERCLA criteria. Specifically the Division requires the reworked detailed analysis of alternatives to include how the sources of releases will be controlled and to comply with any applicable standards for management of wastes as evaluation criteria.

The Division has not specifically commented on section 4.0 Detailed Analysis of Alternatives of this draft CMS/FS. The Division finds that based on the number and significance of the unresolved issues the evaluation of section 4 is not warranted at this time. This should not be construed as concurrence by the Division on anything contained in Section 4 of the draft CMS/FS.

Response

DOE does not agree that mistakes were made in the CMS/FS process at OU 1. Many of the issues raised by the State have failed to point to specific deficiencies in the CMS/FS report and instead are general statements that are not supported by clear examples. In many cases issues presented are opinions of the State which have not necessarily been identified by the EPA as deficiencies. Several comments received from the State suggest that the document does not include an analysis of the RCRA standards. Because the State did not evaluate the detailed analysis of alternatives where these criteria are evaluated DOE does not believe these comments are warranted. The table included in the response to General Comment #2 delineates how the RCRA evaluation criteria compare to the CERCLA evaluation criteria which are included in the detailed analysis of alternatives. The State has suggested in several comments that the RCRA criteria have not been considered. As shown in the table included in the response to General Comment #2 CERCLA and RCRA evaluation criteria are similar and are discussed at length in Section 4.0 of the CMS/FS report.

Resolution

During the meeting held on December 14, 1994 between DOE, EPA and CDPHE the State revised its position that the OU 1 CMS/FS report does not contain sufficient information regarding the RCRA CAP evaluation criteria with the exception that source control measures are not adequately discussed under alternatives that do not attempt to remediate the source of contamination at IHSS 119.1. The revised CMS/FS report will include more a detailed discussion concerning source control measures under each alternative.

Comment 20

Failure to Adequately Consider Risk in Evaluating Alternatives -- In the CMS/FS document DOE based its decision on whether remediation alternatives protected human health solely on the modeled predictions of the fate and transport of one chemical PCE. They did not discuss CC14, 1,1-DCE, or any other hazardous constituents. This is unacceptable. RAGS Part B states that all chemicals with risks greater than 1×10^{-6} should remain on the list of chemicals of potential concern for that medium (RAGS part B p 16). A remediation decision based on only one chemical does not consider the cumulative risks from all chemicals in a particular media. In this case, the remediation decision does not even consider the risks from CC14 and 1,1-DCE, both of which are more toxic and present in higher concentrations at OU1 than PCE. Moreover, HQs were not even calculated for inhalation exposure (see Tables C-6-4, 5 & 6) because no inhalation RfD was available for PCE.

If DOE had done a toxicity assessment on this chemical, it would have been apparent that there is no evidence that this chemical causes local respiratory tract irritation, so that it would be appropriate to do route-to-route extrapolation on the oral toxicity factor for this chemical. As it is, DOE did not even evaluate the single chemical it assessed in the CMS/FS for noncarcinogenic effects by the inhalation route of exposure.

Response

The revised OU 1 CMS/FS will include each BRA COC in the risk evaluation for each alternative, with the addition of TCE due to its presence in unusually high concentrations at OU 1. Results from the groundwater model will be examined for each of these COCs and will be incorporated in the appropriate residual risk discussions.

The residual risk for the residential receptor will be documented consistent with the methodology presented in Appendix C. An inhalation reference dose for PCE was not available in IRIS, HEAST, or ECAO. The issue of a RfD for PCE will be deferred to ECAO for additional guidance prior to revision of the CMS/FS report.

Resolution

The resolution to this comment is as stated in the response above.

Comment 21

Groundwater Modeling This model is a first attempt to describe a complex system and as such tends to raise as many or more questions than it answers about the conceptualization of the source locations and inclusion of decay products. The concept of a single flow line within a preferential channel may not adequately describe the flow system between the chosen calibration wells. Slumping is an active process on the hillside and may interrupt what appears to be a bedrock low channel. Current top of bedrock information may not be detailed enough to define a single flow path accurately; therefore this model represents a theoretical flow path with a gradient similar to flow paths that may exist on the hillside. Only one conceptualization of the source was considered: a residual DNAPL located in one cell at the bedrock/alluvium interface. Alternate source conceptualizations such as diffusion into the pore waters of the bedrock between fractures were not mentioned. The model shows a fair amount of contaminant moving through the bedrock portion of the model so a source within bedrock could be important. Discussion of the choices made in the model conceptualization is an important element in model documentation.

Contaminant calibrations were apparently performed with less than the full suite of available data and not all contaminants in the PCE decay chain were considered. The source and location of each succeeding contaminant becomes dispersed from the transport of its parent product. Such complex linkage of contaminant models becomes too difficult for a transport model dealing with one product at a time. Recognition of this complexity would indicate this model is not conservative.

The English/Metric conflict is not yet resolved in this country. Data in this report is presented in metric units but the model is run in English units and the conversions are not presented. The best option seems to be to present both to facilitate review of the model.

Response

Specific issues in this comment are addressed in the following bullets:

The concept of a single flow line within a preferential channel is based on the hydrogeologic conditions and hydrogeologic conceptual model presented in the RFI/RI report and on fundamental techniques for developing and applying a numerical model. Data from the RFI/RI report reveal limited saturated conditions at OU 1, indicating that flow directions are restricted laterally. The data also indicate that flow is down the hillside, consistent with porous media flow and typical hillslope hydrology. The alignment of the modeled flowpath corresponds to the suspected source area beneath IHSS 119.1 and the groundwater flow direction coincident with the bedrock channel, consistent with the Phase III RFI/RI. Therefore, the model represents the most credible flowpath from IHSS 119.1 to Woman Creek. As such, the modeled flowpath is the shortest flowpath in terms of distance and travel time. Other flowpaths would represent longer, less conservative flowpaths.

With regard to slumping, the interruption referred to in the comment may have little to no effect on groundwater flow direction and magnitude. The geologic cross section produced as part of the Phase III RFI/RI from geologic mapping during the construction of the french drain does not indicate that discontinuities caused by mass movement of colluvium interrupt the bedrock channel, which is represented in the model (refer to Volume IV Appendix A of the Phase III RFI/RI figure showing the vertical section of the french drain from station 16+00 to 16+50). The section actually shows the shear plane as conforming with the bedrock channel (in the section the shear plane is also referred to as a potential shear plane and a discontinuous shear plane).

The source represented in the model is that presented in the Phase III RFI/RI as the most credible based on data collected during the RFI/RI. Since the model over estimates all COC concentrations larger sources (in terms of size) due to spreading caused by decay or alternate sources are accounted for indirectly by the model. Consider also the possibility of three sources for groundwater contamination: a source above the water table, a source at the bedrock/colluvium interface, and a source in the bedrock. For a source above the water table, the contaminant could not dissolve freely into groundwater. A constant source at the bedrock/colluvium interface could dissolve indefinitely into groundwater. A source in the bedrock could also dissolve into groundwater but would migrate at a slower rate than the source at the bedrock/colluvium interface. Thus, a constant source at the bedrock/colluvium interface represents a conservative scenario. Diffusion as a release mechanism would result in much smaller releases of COCs because it typically occurs at rates much lower than groundwater flow. Further discussion of conservatism and sources is contained on responses to specific comments.

Movement of a solute in bedrock does not indicate source in bedrock. No data gap with regard to bedrock was identified in the Phase III RFI/RI report. Therefore, no bedrock source was simulated in the modeling.

With regard to the issue of conservatism, the model is conservative in two aspects. The simulated groundwater flow is conservative because the model always assumes flow occurs, whereas there are many areas and times of no flow (or low flow) due to dry conditions. The overall hydraulic gradients and therefore Darcian velocities are comparable to those observed at the site. Model predictions are conservative because they consistently over predict COC concentrations. TCE has been included as a COC in the model predictions.

The COCs modeled are consistent with the COCs identified in the Phase III RFI/RI baseline risk assessment and discussed with the agencies on May 23, 1994. This meeting included DOE's explanation of exactly how the model was to be constructed. All parties participated in the discussion. The model was developed in accordance with these discussions as well as with the active participation of CDPHE and EPA representatives during the various informal working meetings that occurred during the modeling process. The function of the model in the FS is to provide a predictive tool to facilitate the selection of a remedial alternative.

Resolution

The resolution of the topics covered in this comment is discussed in more detail in the response and resolution of specific comments.